Validation of IRDF-2002 Dosimetry Library on FNG-Series of Benchmark Experiments

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Data Development Project of the International Atomic Energy Agency (IAEA) aimed at updating the library of dosimetry cross sections IRDF-2002 was completed recently. Within this project the IRDF-90 library was reviewed and updated using source data from the JENDL-99/Dosimetry File and the Russian Reactor Dosimetry File (RRDF). Several reactions in RRDF were revised or improved within the scope of this project.

The new IRDF-2002 file was applied in the analysis of several benchmark experiments performed at the Frascati Neutron Generator (FNG):
- FNG-ITER Blanket Bulk Shield
- FNG Silicon Carbide
- FNG Tungsten

These benchmark experiments involved several reaction rate measurements covering fast to thermal neutron energy range, like Au-197(n,g), Mn-55(n,γ), In-115(n,n'), Ni-58(n,p), Fe-56(n,p), Al-27(n,α), Ni-58(n,2n), Zr-90(n,2n) and Nb-93(n,2n). The analyses included both the comparison of the measured and calculated reaction rates as well as the uncertainty estimations based on the corresponding cross-section covariance matrices. To determine the progres achieved with the new file the results were compared to those using the IRDF-90 data.

The main purpose of repeating the calculations with the new dosimetry cross sections was to check for any improvement between measured and calculated reaction rates (compared to IRDF-90) and removal of some inconsistent trends in the results for different monitors. The results represent an indirect validation of the new IRDF-2002 dosimetry library.

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